

Chapter 4 - SHORTGRASS PRAIRIE CONSERVATION REGION

Description

The Shortgrass Prairie Conservation Region is located in the western third of Kansas. It is primarily in the High Plains and a portion of the Arkansas River Lowlands physiographic regions (Figure 4) (Kansas Geological Survey 1997).

The High Plains is composed of sediment eroded from the Rocky Mountains (Wilson 1984). The flat almost featureless plain is broken by rugged breaks and valleys at sites such as the Arikaree Breaks near St. Francis and along Ladder Creek in Scott County. The dominant grasses of the region are typically of short stature and have large extensive root systems which enables the plants to better tolerate long periods of unfavorable conditions (Physiographic 1997). Trees are scarce and desert type plants, such as cactus and yucca, are common. Water in an underground layer of sand and gravel, called the Ogallala Aquifer, is the main source of ground water in western Kansas (Wilson and Bennett 1985).

The Arkansas River Lowlands follow the Arkansas River corridor. The riverbed is filled with sediments washed down from the Rocky Mountains by the river (Wilson 1984). The only river in Kansas which originates in the mountains, the Arkansas River channel is wide and shallow, with much of the water flowing underground through the porous sand in this system (Wilson and Bennett 1985). The relatively flat terrain is disrupted by sand hills along the south side of the river formed in the Quaternary period, making them the geologically youngest soils in Kansas (Wilson 2010)

Because it sits in the rain shadow of the Rocky Mountains, this is the driest region of the state with rainfall averaging 10 to 20 inches annually (Cushman and Jones 1988). Summer (June-August) is the major rainy season throughout the region, and rainfall is almost entirely the result of convective thunderstorms. Winter precipitation is a small proportion of the total annual amount, less than 2.5 in (Laurenroth and Milchunas 1992). The native plants in this area are adapted to stresses such as drought, grazing and fire. This region is defined by the dominant short grass species that occur in a higher abundance than in the other conservation regions. The semiarid conditions of the region are not severe enough to discourage cultivated agriculture. With its nearly level landscape, relatively fertile soil, and often aided by groundwater irrigation, this is among the state's most intensively farmed regions (Brooks 1985). Crops such as wheat, corn, soybeans, and grain sorghum are grown on large farms. Much of the grain produced is used to feed cattle for the production of beef (Laurenroth and Milchunas 1992). Another economically important industry in the area is petroleum production. In the south there is the large Hugoton gas field with oil resources scattered over the whole region (Busby and Zimmerman 2001). Population is sparse in this part of the state, often with only two or three small towns per county.

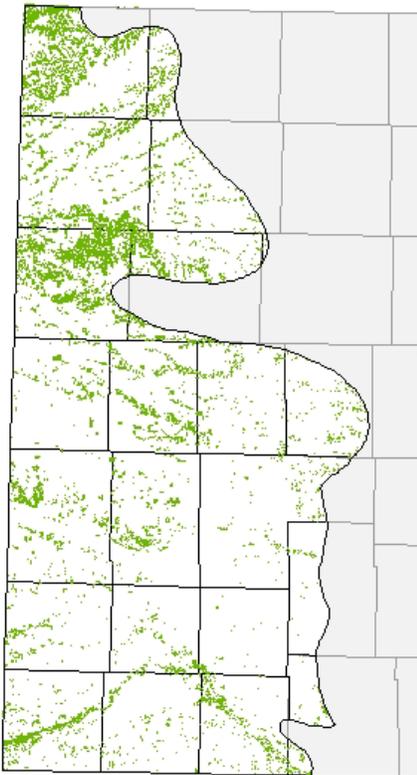


Major rivers are the Cimarron and Arkansas in the south, the Smoky Hill in the central part of the region, the headwaters of the Solomon and Saline in the north, as well as portion of the Republican which cuts through the northwest corner of the state.

Priority habitats in the Shortgrass Prairie Conservation Region

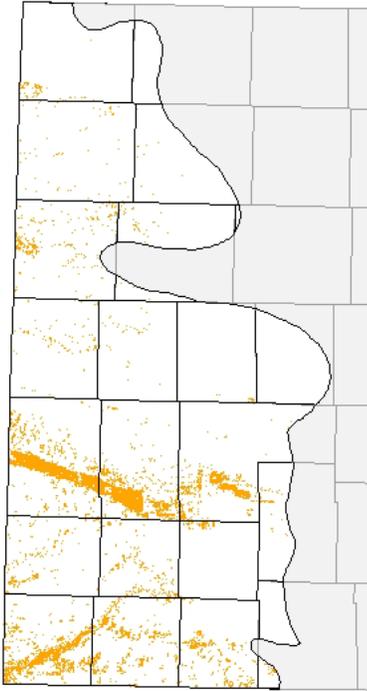
Habitats considered important for the conservation of biodiversity of the region include Shortgrass Prairie, Sandsage Shrubland, Herbaceous Wetlands and Playas, Deciduous Floodplain, Aquatic (lotic and lentic), and Riparian Shrubland (Figure 4). The last three can be considered together as the riparian corridor complex for this section. Shortgrass Prairie and Sandsage Shrubland habitats are the primary habitats within this conservation region. Other habitats that occur within the region, but are not considered priority, are Mixed Prairie, CRP/Native, CRP/Introduced Grass, Cropland Urban Areas, and Seeps and Springs.

Shortgrass Prairie



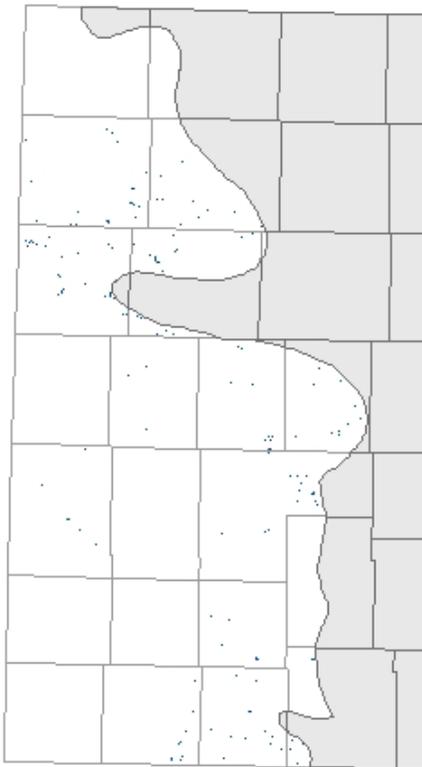
The relative condition of the Shortgrass Prairie habitat is currently good with a stable trend. The quality of the Shortgrass Prairie Habitat is unknown. Shortgrass Prairie Habitats are identified by the dominant short grass species like Buffalo Grass (*Buchloe dactyloides*), and Blue Grama (*Bouteloua gracilis*). These species are dominant on well drained soils or rocky slopes and are highly resistant to drought. Associations of Blue Grama/Hairy Grama (*Bouteloua hirsuta*) occur on loamy or sandy soils, and Blue Grama/Buffalo Grass/Western Wheatgrass (*Pascopyrum smithii*) on clay soils (Brooks 1985). While grasses are often dominant in this regions, vegetative composition also includes a robust forb component such as Heath Aster, Engelmann Daisy, Slimflower Scurfpea, and the ever-present Yarrow, along with legumes like Milkvetches and Locoweeds, can be found throughout Shortgrass Prairie Habitat (Brooks 1985). Much of the original shortgrass prairie habitat has been converted to crop production. Many crop fields have been enrolled in the Conservation Reserve Program (CRP) because of the potential for soil loss due to erosion (Cushman and Jones 1988), which aids the effort to return some of the land back to shortgrass prairie.

Sandsage Shrubland



The Sandsage Shrubland habitat is declining both in quality and quantity. This habitat is located primarily in the southwestern portion of Kansas, along the valleys of the Cimarron and Arkansas rivers. Sandsage (*Artemisia filifolia*) and grasses such as Sand Bluestem (*Andropogon hallii*) and Sandreed Grass (*Calamovilfa longifolia*) are dominant in the Sandsage Shrubland Habitat. Sandsage functions as an important soil stabilizer by breaking surface winds. Were it not for this plant, much of the western sand prairie would be shifting dunes. Sandsage also provides forage, shade and shelter for smaller kinds of wildlife when all other plants succumb to the intense heat of a High Plains summer (Brooks 1985).

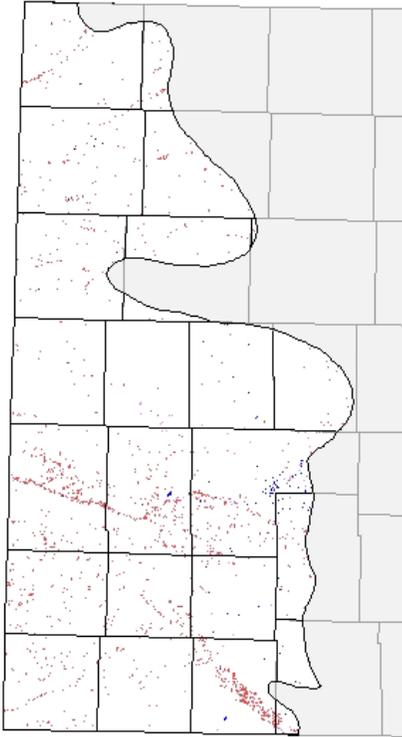
Herbaceous Wetland



The Herbaceous Wetland habitat in the Shortgrass Prairie Conservation Region includes grass and forb playa lakes, low or wet prairie, freshwater marsh, and bulrush marsh. Playa lakes are the predominant herbaceous wetlands of the region. Playa lakes are small, circular basins and most are shallow, clay-lined, ephemeral wetlands that hold water during rainy periods. Because rainfall is the only source of water, playa lakes go through a wet-dry cycle each year. The condition of the playa lakes has been significantly impacted by human activity. Plowing, drainage, livestock, watering, and irrigation have severely altered them by decreasing the amount of water input into the system or completely eliminating the wetland altogether. They have also been polluted by sedimentation and runoff of fertilizers and pesticides. Grasses and forbs including Scarlet Globemallow (*Sphaerlcea coccinea*), Blue Mudplantain (*Heteranthera limosa*), Prairie Zinnia (*Zinnia grandiflora*), Muhly Grass (*Muhlebergia torreyi*), Knotweed (*Polygonum* spp), Watergrass (*Echinochloa* spp), and Western Wheatgrass grow in more mesic sites such as the margins of playas. Prairie Cordgrass (*Spartina pectinata*) thrives in the low or wet prairie. Many bulrush (*Scirpus* spp.) and cattail (*Typha* spp.) species are found in freshwater marshes. Bulrush marshes are home to Common Three-

Square Sedge (*Scirpus pungens*). The current quality of Herbaceous Wetland Habitat is unknown and the trend in quantity is declining.

Riparian Corridor Complex



The Riparian Corridor Complex is composed of Deciduous Floodplain habitat, lotic surface water habitat, lentic surface water habitat, and Riparian Shrubland habitat. The riparian corridor historically consisted of grassland on the ephemeral or intermittent streams with trees only occurring along big rivers. The relative quality and quantity of the components of this habitat complex are declining. Riparian corridors provide an important edge effect and allows for the connection of travel corridors between fragmented habitats. The Deciduous Floodplains are temporarily flooded habitats. Dominant tree species are Pecan (*Carya illinoensis*), Bur Oak (*Quercus macrocarpa*), Green Ash (*Fraxinus pennsylvanica*), American Elm (*Ulmus americana*), Eastern Cottonwood (*Populus deltoids*), Sugar Maple (*Acer saccharum*), River Birch (*Betula nigra*), and Hackberry (*Celtis occidentalis*). Aside from the major rivers, surface water (lotic and lentic) in this region is mostly ephemeral in nature due to their dependence on precipitation or snowmelt and the Short-grass Prairie Conservation Region receives the least amount of precipitation in the state. Surface water also suffers from decline due to the lowering of the water table and surface and ground water withdrawal for irrigation.

Riparian Shrublands occurring along rivers, streams and surface waters, and are characterized by the dominant vegetation types such as willows (*Salix* spp.), Indigo bush (*Amorpha* spp.), and the non-native Salt Cedar (*Tamarix* spp.). Deciduous Floodplains and Riparian Shrubland in this region are dependent upon flows that are for the most part intermittent. Because flows are intermittent, aquatic habitats are somewhat ephemeral.

Ecological Focus Areas in the Shortgrass Prairie Conservation Region

Terrestrial

1. Arikaree Breaks
2. Playa Landscape
3. Smoky Hill River Breaks
4. Arkansas River Sandsage Prairie
5. Cimarron Grasslands

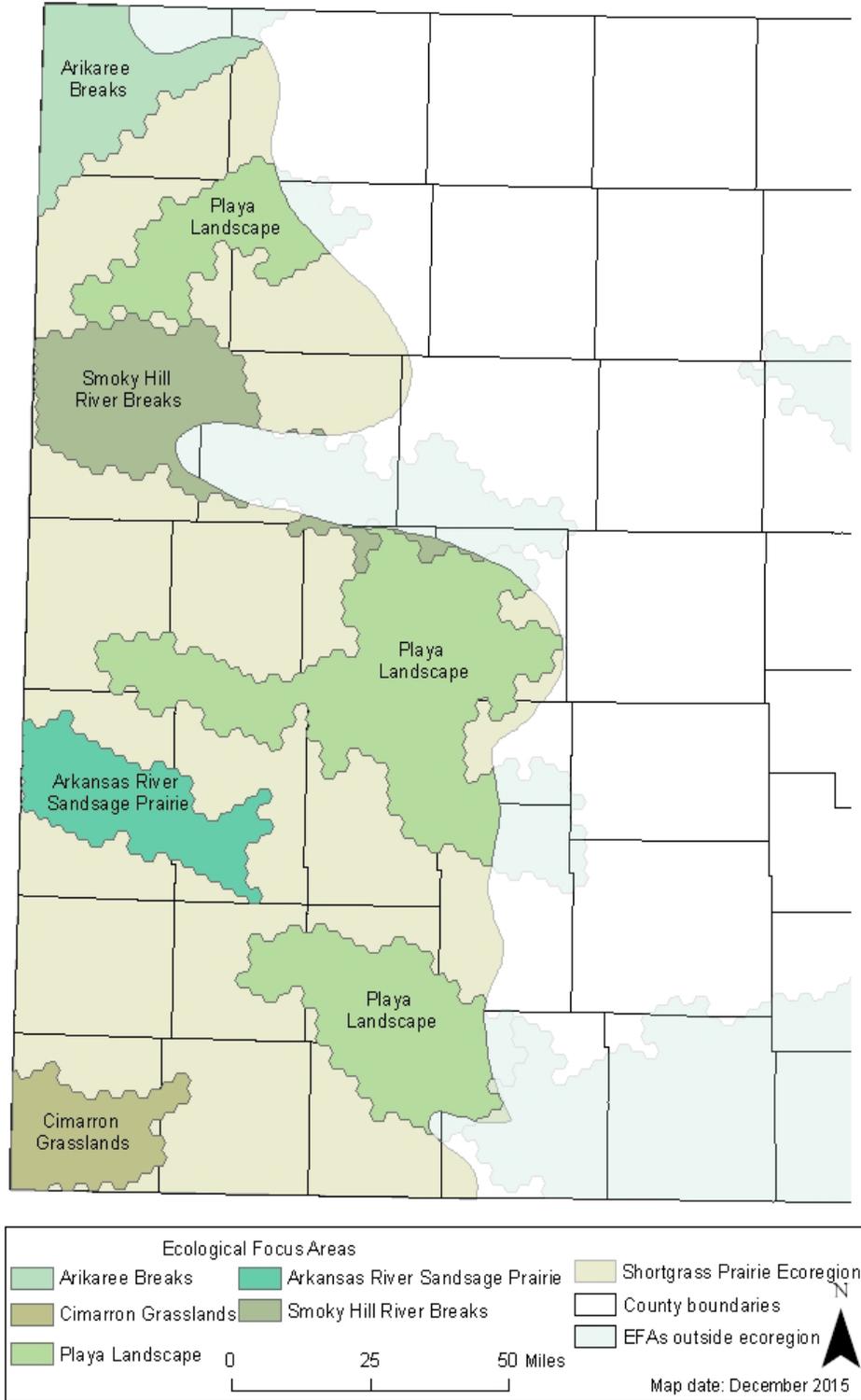
Aquatic

1. Upper Republican
2. Upper Arkansas



Terrestrial EFAs

Figure 5. Terrestrial Ecological Focus Areas of the Shortgrass Prairie Conservation Region. These EFAs represent landscapes where conservation actions can be applied for maximum benefit to Kansas wildlife. Each EFA includes a suite of SGCN and priority habitats.



1. Arikaree Breaks



The Arikaree Breaks Ecological Focus Area is located in the northwestern half of Cheyenne County. This area borders Colorado on the west and Nebraska on the north. The Arikaree Breaks are named for its rough terrain, with deep ravines and gullies that were formed by the erosion of loess soils causing head and side wall cutting creating tributaries of the Arikaree River and South Fork of Republican River. In addition to the rugged terrain of the Arikaree Breaks this area includes a small cluster of playa lakes and the upland areas to the north of the South Fork Republican River. Several of these playas have been prioritized for restoration in the PLJV Playa Decision Support Tool (<http://pljv.org/for-habitat-partners/maps-and-data/playa-decision-support-system/>) and are located within cropland areas. This area is ecologically important as the habitats change throughout the focus area and are host to numerous state listed and SGCN species.

EFA Development

This EFA captures a concentration of Large Natural Areas in Cheyenne County. The final boundary is based on the Level 4 EPA ecoregion (Moderate Relief Rangeland).

* Conservation issues and actions are not listed in any significant order

Conservation Issues

Agriculture

- *Inappropriate grazing practices on native grasslands decreases habitat heterogeneity and can change vegetative community composition
- *Conversion of grasslands to other uses and/or haying of native grasslands causes fragmentation, destroys native flora and decreases habitat availability

Natural system modifications

- *Bank destabilization caused by man and some resulting bank stabilization methods are negatively affecting riparian corridors
- *Improperly applied use of prescribed fire (*i.e.* prominence of annual burning is detrimental for some grassland nesting birds while infrequent burning causes prairie to transition to shrubland or forest)

Invasive and other problematic species and genes

- *Invasive exotic woody and herbaceous plants compete with native flora and modify habitat structure and function for fauna

Pollution

- *Widespread broadcast application of pesticides often causes off-target species mortality, contributes to development of pesticide resistance, and reduces diversity of flora and fauna while increasing soil salinity
- *Overuse/misapplication of pesticides and fertilizer also contribute to water quality degradation from runoff

Conservation Actions

Land/water protection

- *Use conservation easements to prevent further fragmentation

- *Promote field border programs and county road easements which are landowner and wildlife friendly
- *Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices
- *Acquire key parcels of land including corridors from willing sellers and/or donors

Land/water management

- *Increase the heterogeneity of native habitats, as well as general landscapes by using greenways, corridors, buffer strips, refuges and the Conservation Reserve
- *Implement ecologically sensitive grazing and haying practices for shortgrass prairie on private and public lands; as well as promoting the responsible, well-planned use of prescribed fire as a management/restoration tool
- *Continue to develop and implement incentive programs for landowners and managers to promote heterogeneity and diversity for wildlife while maintaining viable farming/ranching operation (*i.e.* cover crops, defer/limit herbicide applications, CRP grazing reserve)
- *Develop cost-neutral conservation practices for producers to provide for maintenance of ecologically and economically viable farming/ranching operations (*i.e.* patch burn grazing)
- *Develop and implement methods to offset economic practices (*i.e.* wind farms, farm management systems encouraging overproduction, conversion of marginal lands into crop production, urbanization) that have negative environmental impacts
- *Reduce grazing impacts by designing and encouraging implementation of wildlife friendly grazing systems, drought management plans, and conservation payment systems
- *Encourage the use of CRP as a grazing reserve to allow recovery of native range

Education and awareness

- *Conduct wildlife surveys for data lacking species. Surveys should be rigorous, repeatable, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics
- *Continued disease monitoring (Chytrid Fungus, Ranavirus, Snake Fungal Disease, etc)
- *Research cover crops benefits for wildlife
- *Develop a broad scale education approach and outreach program detailing the impacts of fragmentation, woody invasion and encroachment, energy development and other land use changes on flora and fauna

External capacity building

- *Work with other state agencies to avoid, minimize, reduce and mitigate impacts to habitat resulting from their programs
- *Develop/expand partnerships to assist in addressing conservation issues

Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------------|---------------------|--------------------------------|
| Insect | American Bumble Bee | <i>Bombus pensylvanicus</i> |
| Insect | Monarch | <i>Danaus plexippus</i> |
| Gastropods | Xeric Ambersnail | <i>Succinea vaginacontorta</i> |

Tier 2 SGCN

| | | |
|------------|----------------------------|---------------------------------|
| Amphibians | Tiger Salamander | <i>Ambystoma tigrinum</i> |
| Birds | American Tree Sparrow | <i>Spizella arborea</i> |
| Birds | Baltimore Oriole | <i>Icterus galbula</i> |
| Birds | Barn Owl | <i>Tyto alba</i> |
| Birds | Bell's Vireo | <i>Vireo bellii</i> |
| Birds | Bullock's Oriole | <i>Icterus bullockii</i> |
| Birds | Burrowing Owl | <i>Athene cunicularia</i> |
| Birds | Cassin's Sparrow | <i>Peucaea cassinii</i> |
| Birds | Chestnut-collared Longspur | <i>Calcarius ornatus</i> |
| Birds | Common Nighthawk | <i>Chordeiles minor</i> |
| Birds | Common Poorwill | <i>Phalaenoptilus nuttallii</i> |

Tier 2 SGCN

| | | |
|-------------|-----------------------------|-------------------------------------|
| Birds | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| Birds | Ferruginous Hawk | <i>Buteo regalis</i> |
| Birds | Golden Eagle | <i>Aquila chrysaetos</i> |
| Birds | Grasshopper Sparrow | <i>Ammodramus savannarum</i> |
| Birds | Greater Prairie-Chicken | <i>Tympanuchus cupido</i> |
| Birds | Lark Bunting | <i>Calamospiza melanocorys</i> |
| Birds | Lark Sparrow | <i>Chondestes grammacus</i> |
| Birds | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Birds | McCown's Longspur | <i>Rhynchopanes mccownii</i> |
| Birds | Northern Bobwhite | <i>Colinus virginianus</i> |
| Birds | Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> |
| Birds | Spotted Towhee | <i>Pipilo maculatus</i> |
| Birds | Swainson's Hawk | <i>Buteo swainsoni</i> |
| Birds | Western Kingbird | <i>Tyrannus verticalis</i> |
| Crustaceans | Ringed Crayfish | <i>Faxonius neglectus</i> |
| Gastropods | Mudbank Ambersnail | <i>Catinella vagans</i> |
| Insect | A scarab beetle | <i>Geomyphilus kiowensis</i> |
| Insect | A scarab beetle | <i>Onthophagus knausi</i> |
| Insect | A scarab beetle | <i>Orizabus pyriformis</i> |
| Insect | A scarab beetle | <i>Pardalosus neodistinctus</i> |
| Insect | A scarab beetle | <i>Tetraclipeoides dentigerulus</i> |
| Insect | A scarab beetle | <i>Trox paulseni</i> |
| Insect | A sweat bee | <i>Dieunomia apacha</i> |
| Insect | A wool-carder bee | <i>Anthidium maculosum</i> |
| Insect | Black-and-gold Bumble Bee | <i>Bombus auricomus</i> |
| Insect | Hunt's Bumble Bee | <i>Bombus huntii</i> |
| Insect | Old World Swallowtail | <i>Papilio machaon</i> |
| Insect | Ottoo Skipper | <i>Hesperia ottoe</i> |
| Insect | Pocket Gopher Flower Beetle | <i>Eupharia disciollis</i> |
| Insect | Regal Fritillary | <i>Argynnis idalia</i> |
| Insect | Two-spotted Skipper | <i>Euphyes bimacula illinois</i> |
| Insect | Southern Plains Bumble Bee | <i>Bombus fraternus</i> |
| Insect | Splendid Sweat Bee | <i>Agopostemon splendens</i> |
| Insect | Yellow Bumble Bee | <i>Bombus fervidus</i> |
| Mammals | Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> |
| Mammals | Western Small-footed Myotis | <i>Myotis ciliolabrum</i> |
| Reptiles | Glossy Snake | <i>Arizona elegans</i> |
| Reptiles | Lesser Earless Lizard | <i>Holbrookia maculata</i> |
| Reptiles | Plains Hog-nosed Snake | <i>Heterodon nasicus</i> |
| Reptiles | Prairie Rattlesnake | <i>Crotalus viridis</i> |

2. Playa Landscape



The Playa Landscape Ecological Focus Area is dotted with shallow, temporary wetlands, each of which lies in the lowest point of a closed watershed. Lined with clay soil, their basins collect and hold water from rainfall and runoff events. These temporary lakes are an important water source for prairie wildlife and serve as stopover locations for migrating waterfowl and shorebirds. Grasslands and shrublands are the primary native habitat found within the playa clusters, though current land use in the area is dominated by crop cultivation. Playas are threatened by agricultural and other land conversion activities that result in sedimentation and loss of function.

EFA Development

This EFA was created by overlaying occurrences of Tier 1 and Tier 2 SGCN on the PLJV playa clusters layer to identify priority landscapes.

Conservation Issues

Agriculture

- *Grassland conversion and improper grazing regimes result in habitat loss and fragmentation, and increases sediment discharge to basins and increases nutrient runoff which alters playa hydrology (timing, duration, and depth of flooding) and water quality

- *Practices such as wetland drainage and cropland cultivation can degrade water quality from runoff and increase sedimentation

Energy Production

- *Development and expansion of wind energy, solar arrays, and oil/gas fields infrastructure and activities also lead to fragmentation and habitat loss

- *Construction of infrastructure and associated roads negatively alter surface water runoff into playas

Natural system modifications

- *The use of terraces built above playas to treat highly erodible land compliance requirements is lowering groundwater levels and degrading playa hydrology

Conservation Actions

Land/water protection

- *Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices

- *Work with willing donors/sellers to prevent further prairie fragmentation and expand connectivity corridors by using conservation easements and other tools

- *Provide landowners incentives for restoring and maintaining Playas

- *Acquire water rights as advisable and possible and/or incentivize landowner retirement of water rights and conversion to less intensive land use

Land/water management

*Increase the heterogeneity of native habitats, as well as general landscapes by using greenways, corridors, buffer strips, refuges and the Conservation Reserve, Grassland Reserve and Sodbuster programs

*Develop incentive programs and cost-effective practices for landowners and managers to protect and restore playa landscapes and to promote heterogeneity and diversity

*Develop cost-neutral conservation practices for producers to provide for maintenance of ecologically and economically viable farming/ranching operations (i.e. patch burn grazing)

*Develop and implement methods to offset economic practices (i.e. wind farms, farm programs that encourage overproduction, conversion of unsuitable lands into production, urbanization) that have negative environmental impacts

*Encourage water right and water quality regulations in appropriate watersheds to reduce aquifer depletion, increase overland flow to basins, and improve water quality

*Develop and implement watershed management plans that approach playa landscape conservation from a holistic perspective.

*Develop a standardized water quality-testing program for playa lakes.

*Promote the use of permanent grass buffers around playa lakes

*Develop projects which inform management and policies to achieve conservation and inform landscape design

Education and awareness

*Conduct wildlife surveys for data lacking species. Surveys should be rigorous, repeatable, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics

*Continued disease monitoring (Chytrid Fungus, Ranavirus, Snake Fungal Disease, etc)

*Investigate ways to determine water use (i.e., implement metering and have fees based upon amount used)

*Educate energy companies on reducing impacts to playas

External capacity building

*Develop/expand partnerships to assist in addressing conservation issues.

Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------------|------------------------|-----------------------------------|
| Birds | Lesser Prairie-Chicken | <i>Tympanuchus pallidicinctus</i> |
| Birds | Piping Plover | <i>Charadrius melodus</i> |
| Birds | Snowy Plover | <i>Charadrius alexandrinus</i> |
| Gastropods | Xeric Ambersnail | <i>Succinea vaginacontorta</i> |
| Insect | American Bumble Bee | <i>Bombus pensylvanicus</i> |
| Insect | Monarch | <i>Danaus plexippus</i> |
| Mammals | Eastern Spotted Skunk | <i>Spilogale putorius</i> |

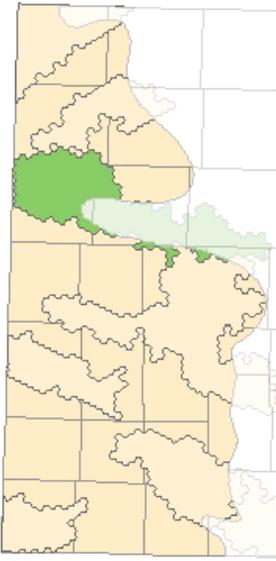
Tier 2 SGCN

| | | |
|------------|----------------------------|----------------------------------|
| Amphibians | Tiger Salamander | <i>Ambystoma tigrinum</i> |
| Birds | American Avocet | <i>Recurvirostra americana</i> |
| Birds | American Golden-Plover | <i>Pluvialis dominica</i> |
| Birds | American Tree Sparrow | <i>Spizella arborea</i> |
| Birds | American White Pelican | <i>Pelecanus erythrorhynchos</i> |
| Birds | Baird's Sandpiper | <i>Calidris bairdii</i> |
| Birds | Barn Owl | <i>Tyto alba</i> |
| Birds | Black-bellied Plover | <i>Pluvialis squatarola</i> |
| Birds | Black-necked Stilt | <i>Himantopus mexicanus</i> |
| Birds | Buff-breasted Sandpiper | <i>Calidris subruficollis</i> |
| Birds | Bullock's Oriole | <i>Icterus bullockii</i> |
| Birds | Burrowing Owl | <i>Athene cunicularia</i> |
| Birds | Canvasback | <i>Aythya valisineria</i> |
| Birds | Chestnut-collared Longspur | <i>Calcarius ornatus</i> |
| Birds | Common Nighthawk | <i>Chordeiles minor</i> |

Tier 2 SGCN

| | | |
|------------|-----------------------------|-------------------------------------|
| Birds | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| Birds | Ferruginous Hawk | <i>Buteo regalis</i> |
| Birds | Grasshopper Sparrow | <i>Ammodramus savannarum</i> |
| Birds | Greater Yellowlegs | <i>Tringa melanoleuca</i> |
| Birds | Lark Sparrow | <i>Chondestes grammacus</i> |
| Birds | Least Sandpiper | <i>Calidris minutilla</i> |
| Birds | Lesser Yellowlegs | <i>Tringa flavipes</i> |
| Birds | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Birds | Long-billed Curlew | <i>Numenius americanus</i> |
| Birds | Long-billed Dowitcher | <i>Limnodromus scolopaceus</i> |
| Birds | Marbled Godwit | <i>Limosa fedoa</i> |
| Birds | McCown's Longspur | <i>Rhynchopanes mccownii</i> |
| Birds | Mississippi Kite | <i>Ictinia mississippiensis</i> |
| Birds | Northern Pintail | <i>Anas acuta</i> |
| Birds | Pectoral Sandpiper | <i>Calidris melanotos</i> |
| Birds | Semipalmated Sandpiper | <i>Calidris pusilla</i> |
| Birds | Short-eared Owl | <i>Asio flammeus</i> |
| Birds | Stilt Sandpiper | <i>Calidris himantopus</i> |
| Birds | Swainson's Hawk | <i>Buteo swainsoni</i> |
| Birds | Upland Sandpiper | <i>Bartramia longicauda</i> |
| Birds | Western Kingbird | <i>Tyrannus verticalis</i> |
| Birds | White-rumped Sandpiper | <i>Calidris fuscicollis</i> |
| Birds | Wilson's Phalarope | <i>Phalaropus tricolor</i> |
| Gastropods | Mudbank Ambersnail | <i>Catinella vagans</i> |
| Insect | A callirhoe bee | <i>Melissodes intortus</i> |
| Insect | A dieunomia bee | <i>Dieunomia triangulifera</i> |
| Insect | A nomia bee | <i>Nomia universitatis</i> |
| Insect | A scarab beetle | <i>Geomyphilus kiowensis</i> |
| Insect | A scarab beetle | <i>Onthophagus knausi</i> |
| Insect | A scarab beetle | <i>Pardalosus neodistinctus</i> |
| Insect | A scarab beetle | <i>Tetraclipeoides dentigerulus</i> |
| Insect | A sweat bee | <i>Trox paulseni</i> |
| Insect | A sweat bee | <i>Dieunomia apacha</i> |
| Insect | A wool-carder bee | <i>Anthidium maculosum</i> |
| Insect | Black-and-gold Bumble Bee | <i>Bombus auricomus</i> |
| Insect | Nevada Bumble Bee | <i>Bombus nevadensis</i> |
| Insect | Old World Swallowtail | <i>Papilio machaon</i> |
| Insect | Orange-bellied Sweat Bee | <i>Agopostemon melliventris</i> |
| Insect | Pocket Gopher Flower Beetle | <i>Eupharia disciollis</i> |
| Insect | Red-belted Bumble Bee | <i>Bombus rufocintus</i> |
| Insect | Regal Fritillary | <i>Argynnis idalia</i> |
| Insect | Southern Plains Bumble Bee | <i>Bombus fraternus</i> |
| Insect | Splendid Sweat Bee | <i>Agopostemon splendens</i> |
| Insect | Yellow Bumble Bee | <i>Bombus fervidus</i> |
| Mammals | Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> |
| Mammals | Swift Fox | <i>Vulpes velox</i> |
| Mammals | Yellow-faced Pocket Gopher | <i>Cratogeomys castanops</i> |
| Reptiles | Eastern Hog-nosed Snake | <i>Heterodon platirhinus</i> |
| Reptiles | Glossy Snake | <i>Arizona elegans</i> |
| Reptiles | Lesser Earless Lizard | <i>Holbrookia maculata</i> |
| Reptiles | Long-nosed Snake | <i>Rhinocheilus lecontei</i> |
| Reptiles | Western Massasauga | <i>Sistrurus tergeminus</i> |
| Reptiles | Plains Hog-nosed Snake | <i>Heterodon nasicus</i> |
| Reptiles | Prairie Rattlesnake | <i>Crotalus viridis</i> |
| Reptiles | Texas Horned Lizard | <i>Phrynosoma cornutum</i> |

3. Smoky Hill River Breaks



The Smoky Hill River Breaks Ecological Focus Area is within the High Plains and Smoky Hills ecoregions and is dominated by the shortgrass prairie ecosystem. Dramatic chalk badlands and bluffs overlook large expanses of rangeland and rocky ravines along the Smoky Hill River. The Smoky Hill River floodplain and its surrounding upland habitats provide valuable refugia to the biodiversity of the EFA. Rangeland grazing is a common practice within the EFA. Issues include fragmentation of prairies and mismanaged grazing practices, which have modified the existing prairies. Protected areas include the Logan Wildlife Area, the Smoky Valley Ranch, and Scott State Park. Numerous SGCN occur within this EFA, including the endemic Scott Riffle Beetle and isolated populations of the Green Toad. Prairie dog colonies provide habitats for many SGCN including the Burrowing Owl, Swift Fox, and Black-footed Ferret.

EFA Development

This EFA captures a concentration of Large Natural Areas in the Chalk Bluffs area. It is similar to the TNC portfolio site “Chalk Bluffs” from the Central

Shortgrass Prairie Ecoregional Plan but excludes the northeastern extent of that site which is dominated by agricultural land.

Conservation Issues

Agriculture

- *Inappropriate grazing practices on native grasslands decreases habitat heterogeneity and can change vegetative community composition
- *Conversion of grasslands to other uses cause fragmentation, destroys native flora and decreases habitat availability
- *Practices such as wetlands drainage and cropland cultivation can degrade water quality from runoff and increase sedimentation

Energy Production

- *Development and expansion of wind energy, solar arrays, and oil/gas fields infrastructure and activities in native grasslands – impacting grasslands and migratory birds, bats, and other wildlife

Natural system modifications

- *The use of surface water from rivers and streams for irrigation is lowering the ground water level

Invasive and other problematic species and genes

- *Sylvatic plague has the potential to impact black-tailed prairie dog populations
- *Invasive woody and herbaceous plants compete with native flora and modify habitat structure and function for fauna

Pollution

- *Widespread broadcast application of pesticides often causes off-target species mortality, contributes to development of pesticide resistance, and reduces diversity of flora and fauna while increasing soil salinity
- *Overuse/misapplication of pesticides and fertilizer also contribute to water quality degradation from runoff

Biological resource use

- *Black-tailed Prairie Dog population is low and under continual threat due to eradication programs

Conservation Actions

Land/water protection

- *Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices
- *Provide incentives to prevent or reduce the likelihood of the sale of key grassland sites for industrial, housing, or other development
- *Promote field border programs and county road easements which are landowner and wildlife friendly
- *Work with willing donors/sellers to prevent further prairie fragmentation and expand connectivity corridors by using conservation easements and other tools

Land/water management

- *Increase the heterogeneity of native habitats, as well as general landscapes by using greenways, corridors, buffer strips, refuges and the Conservation Reserve
- *Implement ecologically-sensitive grazing and haying practices, including rest periods, for shortgrass prairie on private and public lands as well as promoting the responsible, well-planned use of prescribed fire as a management/restoration tool
- *Develop and implement incentive programs for landowners and managers to promote heterogeneity and diversity for wildlife while maintaining viable farming/ranching operation (*i.e.* cover crops, defer/limit herbicide applications, CRP grazing reserve)
- *Develop and implement methods to offset economic practices (*i.e.* wind farms, farm management systems encouraging overproduction, conversion of marginal lands into crop production, urbanization) that have negative environmental impacts
- *Encourage use of CRP as a grazing reserve to allow recovery of native range
- *Promote ecologically sound techniques for flood control, erosion control, non-point source pollution control, and bank stabilization

Education and awareness

- *Conduct wildlife surveys for data lacking species. Surveys should be rigorous, repeatable, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics
- *Research cover crop benefits for wildlife
- *Develop a broad scale education approach and outreach program on the impacts of fragmentation, woody invasion and encroachment, energy development and other land use changes on flora and fauna
- *Develop best management practices to control and manage invasive species
- *Continued disease monitoring (Chytrid Fungus, Ranavirus, Snake Fungal Disease, Sylvatic Plague, etc.)

External capacity building

- *Work with other state agencies, to avoid, minimize, reduce and mitigate impacts to habitat resulting from their programs
- *Partner with industrial, energy, and telecommunication companies as well as private landowners to reduce impacts on native grasslands and lesser prairie chickens by encouraging burial or rerouting of power lines and other structures around key lekking, nesting, and brood rearing habitats

Species management

- *Develop and implement an effective information and educational program focused on the role and value of Black-tailed Prairie Dogs in native grasslands and the importance of ending removal policies for prairie dogs from public and private lands
- *Continue to conduct population and distributional surveys of the Black-tailed Prairie Dog
- *Develop and implement a Black-tailed Prairie Dog Management Plan



Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------------|------------------------|-----------------------------------|
| Amphibians | Green Toad | <i>Anaxyrus debilis</i> |
| Birds | Lesser Prairie-Chicken | <i>Tympanuchus pallidicinctus</i> |
| Gastropods | Xeric Ambersnail | <i>Succinea vaginacontorta</i> |
| Insect | American Bumble Bee | <i>Bombus pensylvanicus</i> |
| Insect | A leafcutter bee | <i>Megachile deflexa</i> |
| Insect | Monarch | <i>Danaus plexippus</i> |
| Insect | Scott Riffle Beetle | <i>Optioservus phaeus</i> |
| Mammals | Black-footed Ferret | <i>Mustela nigripes</i> |
| Mammals | Eastern Spotted Skunk | <i>Spilogale putorius</i> |

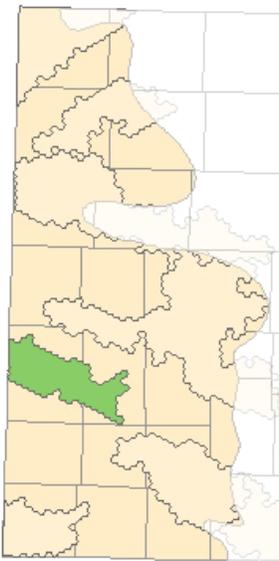
Tier 2 SGCN

| | | |
|------------|---------------------------------|-------------------------------------|
| Amphibians | Tiger Salamander | <i>Ambystoma tigrinum</i> |
| Birds | American Tree Sparrow | <i>Spizella arborea</i> |
| Birds | Baltimore Oriole | <i>Icterus galbula</i> |
| Birds | Barn Owl | <i>Tyto alba</i> |
| Birds | Bullock's Oriole | <i>Icterus bullockii</i> |
| Birds | Burrowing Owl | <i>Athene cunicularia</i> |
| Birds | Cassin's Sparrow | <i>Peucaea cassinii</i> |
| Birds | Chestnut-collared Longspur | <i>Calcarius ornatus</i> |
| Birds | Common Nighthawk | <i>Chordeiles minor</i> |
| Birds | Common Poorwill | <i>Phalaenoptilus nuttallii</i> |
| Birds | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| Birds | Ferruginous Hawk | <i>Buteo regalis</i> |
| Birds | Golden Eagle | <i>Aquila chrysaetos</i> |
| Birds | Grasshopper Sparrow | <i>Ammodramus savannarum</i> |
| Birds | Greater Prairie-Chicken | <i>Tympanuchus cupido</i> |
| Birds | Lark Bunting | <i>Calamospiza melanocorys</i> |
| Birds | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Birds | Long-billed Curlew | <i>Numenius americanus</i> |
| Birds | McCown's Longspur | <i>Rhynchopanes mccownii</i> |
| Birds | Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> |
| Birds | Short-eared Owl | <i>Asio flammeus</i> |
| Birds | Swainson's Hawk | <i>Buteo swainsoni</i> |
| Birds | Western Kingbird | <i>Tyrannus verticalis</i> |
| Gastropods | Mudbank Ambersnail | <i>Catinella vagans</i> |
| Insect | A scarab beetle | <i>Geomyphilus kiowensis</i> |
| Insect | A scarab beetle | <i>Onthophagus knausi</i> |
| Insect | A scarab beetle | <i>Orizabus pyriformis</i> |
| Insect | A scarab beetle | <i>Pardalosus neodistinctus</i> |
| Insect | A scarab beetle | <i>Tetraclipeoides dentigerulus</i> |
| Insect | A scarab beetle | <i>Trox paulseni</i> |
| Insect | A sweat bee | <i>Agopostemon coloradensis</i> |
| Insect | A sweat bee | <i>Dieunomia apacha</i> |
| Insect | A wool-carder bee | <i>Anthidium maculosum</i> |
| Insect | Bicoloured Sweat Bee | <i>Agopostemon virescens</i> |
| Insect | Black-and-gold Bumble Bee | <i>Bombus auricomus</i> |
| Insect | Evening Primrose Leafcutter Bee | <i>Megachile anograe</i> |
| Insect | Great Plains Giant Tiger Beetle | <i>Amblycheila cylindriformis</i> |
| Insect | Morrison's Bumble Bee | <i>Bombus morrisoni</i> |
| Insect | Ottoe Skipper | <i>Hesperia ottoe</i> |
| Insect | Pocket Gopher Flower Beetle | <i>Eupharia disciollis</i> |
| Insect | Regal Fritillary | <i>Argynnis idalia</i> |
| Insect | Southern Chimney Bee | <i>Diadasia australis</i> |
| Insect | Southern Plains Bumble Bee | <i>Bombus fraternus</i> |

Tier 2 SGCN

| | | |
|----------|-----------------------------|-----------------------------------|
| Insect | Splendid Sweat Bee | <i>Agopostemon splendens</i> |
| Insect | Yellow Bumble Bee | <i>Bombus fervidus</i> |
| Mammals | Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> |
| Mammals | Spotted Ground Squirrel | <i>Xerospermophilus spilosoma</i> |
| Mammals | Swift Fox | <i>Vulpes velox</i> |
| Mammals | Western Small-footed Myotis | <i>Myotis ciliolabrum</i> |
| Reptiles | Eastern Hog-nosed Snake | <i>Heterodon platirhinus</i> |
| Reptiles | Glossy Snake | <i>Arizona elegans</i> |
| Reptiles | Lesser Earless Lizard | <i>Holbrookia maculata</i> |
| Reptiles | Long-nosed Snake | <i>Rhinocheilus lecontei</i> |
| Reptiles | Plains Hog-nosed Snake | <i>Heterodon nasicus</i> |
| Reptiles | Prairie Rattlesnake | <i>Crotalus viridis</i> |

4. Arkansas River Sandsage Prairie



The Arkansas River Sandsage Prairie Ecological Focus Area is located in the southwestern portion of Kansas, adjacent to the Arkansas River drainage from the Colorado/Kansas state line to the Finney/Kearny county line. The area is characterized by fine sandy soils and rolling sand dunes. Sandsage brush and deep-rooted, sand tolerant native grasses (Sand Bluestem, Sand Lovegrass, Giant Sandreed Grass, etc.) make this ecosystem unique. The once common sandsage shrubland habitat in Kansas is declining in both quality and quantity due to the fragmentation and conversion of grasslands to agricultural crop production through the use of center pivot irrigation, lack of proper grazing management, uniformed herbicide applications to eliminate sandsage, invasive species, and energy development. Moreover, the issue is compounded by the observed difficulties of successfully restoring formerly cropped sites to native species. This area is ecologically sensitive as well as ecologically important, because it contains some of the last remaining intact remnants of sandsage prairie in the state.

EFA Development

This EFA was delineated using Large Natural Areas, CHAT Connectivity, Species of Concern and Land Cover as base data. Within this area 2.5 km hexagons with $\geq 50\%$ Natural Vegetation were selected. Note this EFA extends further north than the extent of the TNC portfolio site, including a concentration of CRP land (from 2005).

Conservation Issues

Agriculture

- *Inappropriate grazing practices on native grasslands decreases habitat heterogeneity and can change vegetative community composition
- *Conversion of grasslands to other uses causes fragmentation, destroys native flora, and decreases habitat availability

Invasive and other problematic species and genes

- *Invasive plants compete with native flora and modify habitat structure and function for fauna

Biological resource use

- *Black-tailed Prairie Dog population is low and under continual threat due to eradication programs

Conservation Actions

Land/water protection

*Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices.

*Work with willing donors/sellers to prevent further prairie fragmentation and expand connectivity corridors by using conservation easements and other tools

Land/water management

*Increase the heterogeneity of native habitats, as well as general landscapes by using greenways, corridors, buffer strips, refuges and the Conservation Reserve

*Implement ecologically-sensitive grazing and haying practices, including rest periods, for shortgrass prairie on private and public lands as well as promoting the responsible, well-planned use of prescribed fire as a management/restoration tool

*Develop and implement incentive programs for landowners and managers to promote heterogeneity and diversity for wildlife while maintaining viable farming/ranching operation (*i.e.* cover crops, defer herbicide applications)

*Develop new programs or modify existing incentive programs encouraging implementation of wildlife friendly grazing systems, drought management plans, and conservation payment systems for private lands

*Develop cost-neutral conservation practices for producers to provide for maintenance of ecologically and economically viable farming/ranching operations (*i.e.* patch burn grazing)

*Develop and implement methods to offset economic practices (*i.e.* wind farms, farm management systems encouraging overproduction, conversion of marginal lands into crop production, urbanization) that have negative environmental impacts

*Use CRP as a Grassbank to allow recovery of native range.

*Develop a sandsage shrubland restoration plan that identifies mitigation opportunities and funding sources.

*Promote improved water quality

*Develop an integrated exotic and invasive species control program.

*Implement programs to minimize disturbance of public and private lands, including roads and trails.

Education and awareness

*Conduct wildlife surveys for data lacking species. Surveys should be rigorous, repeatable, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics

*Research cover crop benefits for wildlife

*Conduct research to better understand the threats of exotic and invasive species

*Continued disease monitoring (Chytrid Fungus, Ranavirus, Snake Fungal Disease, Sylvatic Plague, etc.)

*Research methods to control and manage sagebrush, instead of its elimination

*Conduct research on ways to improve effectiveness and efficiency of irrigation practices

*Determine dewatering impacts on aquatic wildlife and wetlands

External capacity building

*Develop better coordination of government programs to increase efficiency of actions

Species management

*Develop and implement an effective information and educational program focused on the role and value of Black-tailed Prairie Dogs in native grasslands and the importance of ending removal policies for prairie dogs from public and private lands

*Develop and implement a Black-tailed Prairie Dog Management Plan

*Continue to conduct population and distributional surveys of the Black-tailed Prairie Dog

Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------------|------------------------|-----------------------------------|
| Birds | Lesser Prairie-Chicken | <i>Tympanuchus pallidicinctus</i> |
| Gastropods | Xeric Ambersnail | <i>Succinea vaginacontorta</i> |
| Insect | American Bumble Bee | <i>Bombus pensylvanicus</i> |
| Insect | Monarch | <i>Danaus plexippus</i> |
| Insect | Sage Sphinx | <i>Lintneria eremitoides</i> |

Tier 2 SGCN

| | | |
|------------|-----------------------------|-------------------------------------|
| Amphibians | Tiger Salamander | <i>Ambystoma tigrinum</i> |
| Birds | American Tree Sparrow | <i>Spizella arborea</i> |
| Birds | Barn Owl | <i>Tyto alba</i> |
| Birds | Bullock's Oriole | <i>Icterus bullockii</i> |
| Birds | Burrowing Owl | <i>Athene cunicularia</i> |
| Birds | Cassin's Sparrow | <i>Peucaea cassinii</i> |
| Birds | Chestnut-collared Longspur | <i>Calcarius ornatus</i> |
| Birds | Common Nighthawk | <i>Chordeiles minor</i> |
| Birds | Common Poorwill | <i>Phalaenoptilus nuttallii</i> |
| Birds | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| Birds | Grasshopper Sparrow | <i>Ammodramus savannarum</i> |
| Birds | Lark Bunting | <i>Calamospiza melanocorys</i> |
| Birds | Lark Sparrow | <i>Chondestes grammacus</i> |
| Birds | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Birds | McCown's Longspur | <i>Rhynchopanes mccownii</i> |
| Birds | Scaled Quail | <i>Callipepla squamata</i> |
| Birds | Short-eared Owl | <i>Asio flammeus</i> |
| Birds | Swainson's Hawk | <i>Buteo swainsoni</i> |
| Birds | Western Grebe | <i>Aechmophorus occidentalis</i> |
| Birds | Western Kingbird | <i>Tyrannus verticalis</i> |
| Gastropods | Mudbank Ambersnail | <i>Catinella vagans</i> |
| Insect | A dieunomia bee | <i>Dieunomia triangulifera</i> |
| Insect | A longhorned beetle | <i>Tetraopes pilosus</i> |
| Insect | A scarab beetle | <i>Geomyphilus kiowensis</i> |
| Insect | A scarab beetle | <i>Onthophagus knausi</i> |
| Insect | A scarab beetle | <i>Pardalosus neodistinctus</i> |
| Insect | A scarab beetle | <i>Tetraclipeoides dentigerulus</i> |
| Insect | A scarab beetle | <i>Trox paulseni</i> |
| Insect | A sweat bee | <i>Agopostemon coloradensis</i> |
| Insect | A sweat bee | <i>Dieunomia apache</i> |
| Insect | A wool-carder bee | <i>Anthidium maculosum</i> |
| Insect | Aberrant Cellophane Bee | <i>Colletes aberrans</i> |
| Insect | Black-and-gold Bumble Bee | <i>Bombus auricomus</i> |
| Insect | Orange-bellied Sweat Bee | <i>Agopostemon melliventris</i> |
| Insect | Pocket Gopher Flower Beetle | <i>Eupharia disciollis</i> |
| Insect | Regal Fritillary | <i>Argynnis idalia</i> |
| Insect | Southern Chimney Bee | <i>Diadasia australis</i> |
| Insect | Southern Plains Bumble Bee | <i>Bombus fraternus</i> |
| Insect | Splendid Sweat Bee | <i>Agopostemon splendens</i> |
| Insect | Yellow Bumble Bee | <i>Bombus fervidus</i> |
| Mammals | Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> |
| Mammals | Spotted Ground Squirrel | <i>Xerospermophilus spilosoma</i> |
| Mammals | Swift Fox | <i>Vulpes velox</i> |
| Mammals | Yellow-faced Pocket Gopher | <i>Cratogeomys castanops</i> |
| Plants | Sandhill Goosefoot | <i>Chenopodium cycloides</i> |
| Plants | Sandsage Prairie-clover | <i>Dalea cylindriceps</i> |
| Reptiles | Eastern Hog-nosed Snake | <i>Heterodon platirhinos</i> |
| Reptiles | Glossy Snake | <i>Arizona elegans</i> |

Tier 2 SGCN

| | | |
|----------|------------------------|------------------------------|
| Reptiles | Lesser Earless Lizard | <i>Holbrookia maculata</i> |
| Reptiles | Long-nosed Snake | <i>Rhinocheilus lecontei</i> |
| Reptiles | Western Massasauga | <i>Sistrurus tergeminus</i> |
| Reptiles | Plains Hog-nosed Snake | <i>Heterodon nasicus</i> |
| Reptiles | Prairie Rattlesnake | <i>Crotalus viridis</i> |
| Reptiles | Texas Horned Lizard | <i>Phrynosoma cornutum</i> |



Success Story – Kansas Mammal and Herpetofaunal Atlases

A constant priority for Kansas conservation and management is obtaining vital information on wildlife species and habitats. Data on species/habitat relationships, population demography, and community dynamics increases our ability to identify and interpret potential threats and decide on appropriate actions. The Kansas Mammal Atlas and the Kansas Herp Atlas were developed to address the lack of species data. Both atlases are products of State Wildlife Grants to the Sternburg Museum of Natural History, Fort Hays State University. The Mammal Atlas project began in 2006, while the Herp Atlas started as a small personal project in 1999 but was enhanced by the support of the State Wildlife Grant. For each species the Atlases contain a description of taxonomy, recognition features, distribution, ecology, reproduction, and behavior. Through the long history of professional collecting and the work of thousands of individuals contributing information, our body of knowledge about Kansas mammals and herps continues to grow. This not only benefits education and conservation purposes but contributes to an increasing public awareness of the species in the state.

<https://webapps.fhsu.edu/ksmammal/>
<https://webapps.fhsu.edu/ksherp/default.aspx>

Kansas Herpetofaunal Atlas

Occurrence Summary:

| |
|---------------------------|
| 80,227 Total Records |
| 63,998 Museum Vouchers |
| 16,229 Other Observations |



An adult specimen from Franklin County. Image © Suzanne L. Collins, CNAH.

Welcome to the KHA:

The Kansas Herpetofaunal Atlas (KHA) was the inspiration of, and is dedicated to, Joe Collins. It is built upon the knowledge accumulated through countless hours of field work and painstaking research in libraries and museum collections.

The KHA originated in the spring of 1999 as a small project to document the herpetofaunal diversity of the state using emerging web-based technologies. A State Wildlife Grant (USFWS/KDWPT/Sternberg Museum joint venture) in 2003 facilitated enhancements to the site and produced a significant increase in specimen occurrence records.

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locality d

Kansas Mammal Atlas

Occurrence Summary:

| | |
|--------------------|--------|
| Total Records | 52,720 |
| Museum Vouchers | 49,828 |
| Other Observations | 2,892 |

Overview:

The Kansas Mammal Atlas (KMA) follows the model set by the Kansas Herpetofaunal Atlas (KHA), to document the Kansas biodiversity. A State Wildlife Grant (USFWS/KDWPT joint venture) in 2005 facilitated enhancements to the site and produced a significant increase in specimen occurrence records. Additional assistance was provided by many interested individuals and volunteers. The Atlas continues to be maintained and enhanced by the authors.

The KMA serves both education and conservation. The occurrence records (some going back to the 1800s), represent baseline data for future research, assist with conservation needs as they arise, and contribute to an increasing public awareness of the amphibians and reptiles in the state.

There are 89 species (different kinds) of mammals in Kansas. The KMA contains information on all known occurrences of Kansas' mammals (except humans). Unique to the site, are the most up-to-date distribution maps of each species known to occur (or potentially occur) in the state. Each species account has text descriptions summarizing the description, distribution, natural history, taxonomy, and an ever-growing list of references.

Users have full access to most records and are encouraged to report new occurrences as they are found. Specific locality data for species currently designated as Endangered (E), Threatened (T), or Species in need of Conservation (SINC) by Kansas statute or KDWPT regulation, is limited. Additionally, specific locality for bats are partially restricted due to the potential for spreading White-nose Syndrome among populations. If you need these data, you are encouraged to contact the collection that maintains them and make a request.

The KMA represents the work of thousands of individuals that collected and recorded the 50,000+ specimens and observations presented herein. Our current level of understanding with respect to Kansas' mammal fauna is a result of their efforts. There is still much to learn, and those of you wishing to contribute to the Atlas, may do so by donating specimens or adding observations directly.

I hope you find the KMA useful... comments and suggestions are always welcome.



5. Cimarron Grasslands



The Cimarron Grasslands Ecological Focus Area is located in extreme southwest Kansas and is dominated by shortgrass prairie, but also includes sandsage prairie and riparian communities along the Cimarron River. The focus area includes the Cimarron National Grasslands, the largest publicly owned parcel of land in Kansas and the only parcel managed by the United States Forest Service. This focus area represents a large portion of shortgrass prairie that is surrounded by cropland. Lack of proper grazing management for biological diversity, improper prescribed fire frequency/management, fragmentation of prairie habitat and energy development are a few of the issues impacting this ecological focus area.

EFA Development

The core of this EFA is the TNC portfolio site “Cimarron Grasslands” from the Central Shortgrass Prairie Ecoregional Plan. Hexagons containing outlying parcels of the Cimarron National Grasslands were then added as well as all hexagons intersecting TNC priority areas with a minimum of 50% Natural Vegetation.

Conservation Issues

Agriculture

- *Inappropriate grazing practices on native grasslands decreases habitat heterogeneity and can change vegetative community composition
- *Conversion of grasslands to other uses causes fragmentation, destroys native flora, and decreases habitat availability

Energy Production

- *Development and expansion of wind energy, solar arrays, and oil/gas fields infrastructure and activities in native grasslands – impacting grasslands and migratory birds, bats, and other wildlife

Invasive and other problematic species and genes

- *Exotic and invasive species (*i.e.* Tamarix sp.)

Biological resource use

- *Black-tailed Prairie Dog population is low and under continual threat due to eradication programs

Conservation Actions

Land/water protection

- *Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices.
- *Work with willing donors/sellers to prevent further prairie fragmentation and expand connectivity corridors by using conservation easements and other tools
- *Promote field border programs and county road easements which are landowner and wildlife friendly.

Land/water management

- *Increase the heterogeneity of native habitats, as well as general landscapes by using greenways, corridors, buffer strips, refuges and the Conservation Reserve
- *Implement ecologically-sensitive grazing and haying practices, including rest periods, for shortgrass prairie on private and public lands as well as promoting the responsible, well-planned use of prescribed fire as a management/restoration tool

- *Provide incentives to landowners to maintain, improve, enhance key grassland sites, and reduce intensified agricultural practices
- *Develop and implement incentive programs for landowners and managers to promote heterogeneity and diversity for wildlife while maintaining viable farming/ranching operation (*i.e.* cover crops, defer spraying)
- *Develop and implement methods to offset economic practices (*i.e.* wind farms, farm management systems encouraging overproduction, conversion of marginal lands into crop production, urbanization) that have negative environmental impacts
- *Use CRP as a Grassbank to allow recovery of native range

Education and awareness

- *Conduct wildlife surveys for data lacking species. Surveys should be rigorous, repeatable, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics
- *Research cover crop benefits for wildlife
- *Continued disease monitoring (Chytrid Fungus, Ranavirus, Snake Fungal Disease, etc.)
- *Develop a broad scale education approach and outreach program on the impacts of fragmentation, woody invasion and encroachment, energy development and other land use changes on flora and fauna

External capacity building

- *Work with other state agencies to avoid, minimize, reduce and mitigate impacts to habitat resulting from their programs.

Species management

- *Develop and implement an effective information and educational program focused on the role and value of Black-tailed Prairie Dogs in native grasslands and the importance of ending removal policies for prairie dogs from public and private lands
- *Develop and implement a Black-tailed Prairie Dog Management Plan.
- *Continue to conduct population and distributional surveys of the Black-tailed Prairie Dog
- *Continue Lesser Prairie Chicken surveys. Bury or route power lines around nesting, brood rearing and lek habitats. Acquire, as advisable and possible, conservation easements on critical habitat with protocols for non-impact.

Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------------|------------------------|-----------------------------------|
| Amphibians | Green Toad | <i>Anaxyrus debilis</i> |
| Birds | Lesser Prairie-Chicken | <i>Tympanuchus pallidicinctus</i> |
| Gastropods | Xeric Ambersnail | <i>Succinea vaginacontorta</i> |
| Insect | Arogos Skipper | <i>Atrytone arogos</i> |
| Insect | Monarch | <i>Danaus plexippus</i> |
| Insect | Sage Sphinx | <i>Lintneria eremitoides</i> |
| Insect | American Bumble Bee | <i>Bombus pensylvanicus</i> |
| Reptiles | New Mexico Threadsnake | <i>Rena dissectus</i> |

Tier 2 SGCN

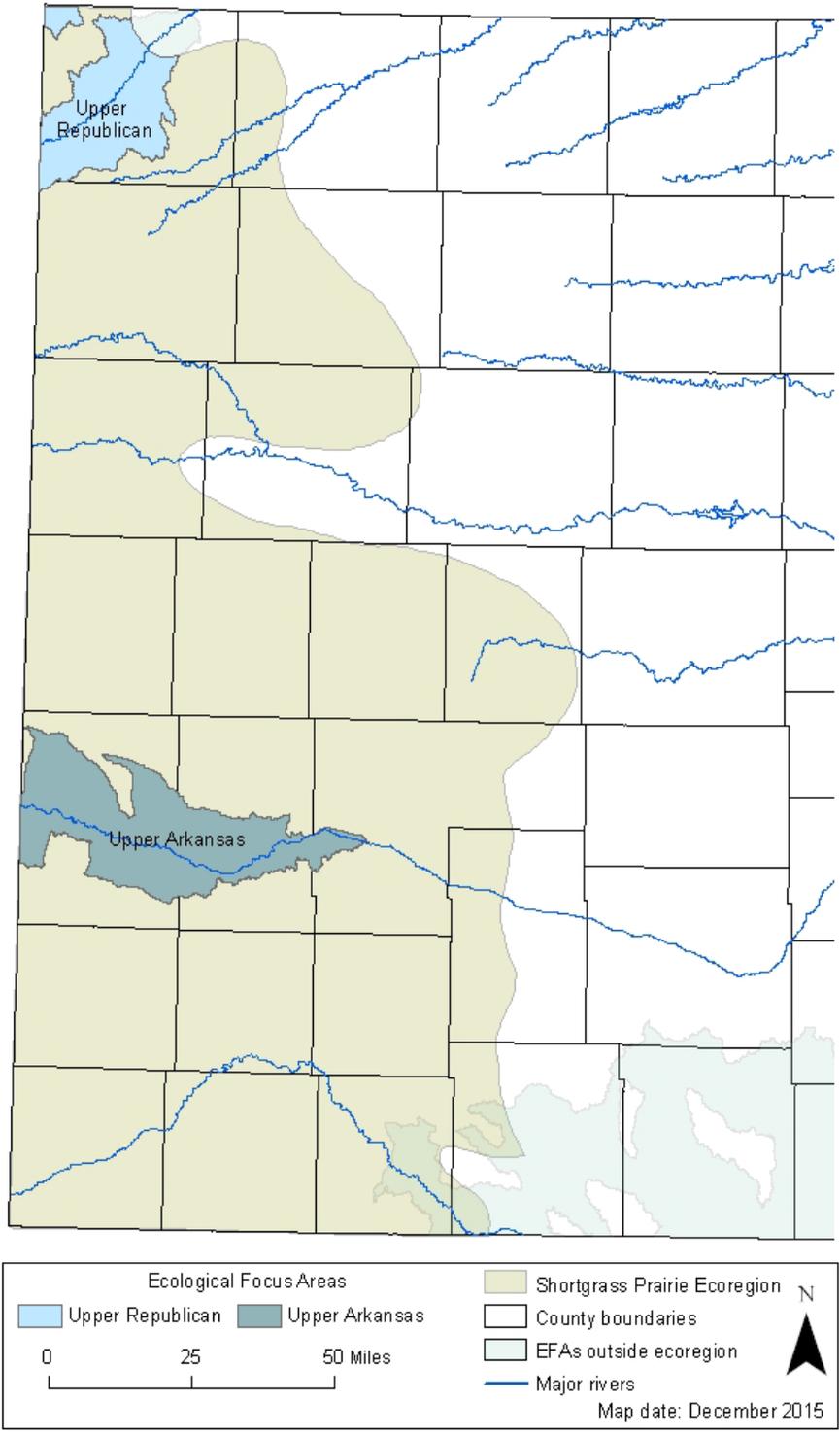
| | | |
|------------|----------------------------|--------------------------------|
| Amphibians | Red-spotted Toad | <i>Anaxyrus punctatus</i> |
| Amphibians | Tiger Salamander | <i>Ambystoma tigrinum</i> |
| Birds | American Avocet | <i>Recurvirostra americana</i> |
| Birds | American Tree Sparrow | <i>Spizella arborea</i> |
| Birds | Baird's Sparrow | <i>Centronyx bairdii</i> |
| Birds | Barn Owl | <i>Tyto alba</i> |
| Birds | Bullock's Oriole | <i>Icterus bullockii</i> |
| Birds | Burrowing Owl | <i>Athene cunicularia</i> |
| Birds | Cassin's Sparrow | <i>Peucaea cassinii</i> |
| Birds | Chestnut-collared Longspur | <i>Calcarius ornatus</i> |
| Birds | Chihuahuan Raven | <i>Corvus cryptoleucus</i> |
| Birds | Common Nighthawk | <i>Chordeiles minor</i> |

Tier 2 SGCN

| | | |
|------------|-----------------------------|--|
| Birds | Common Poorwill | <i>Phalaenoptilus nuttallii</i> |
| Birds | Curve-billed Thrasher | <i>Toxostoma curvirostre</i> |
| Birds | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| Birds | Ferruginous Hawk | <i>Buteo regalis</i> |
| Birds | Grasshopper Sparrow | <i>Ammodramus savannarum</i> |
| Birds | Ladder-backed Woodpecker | <i>Dryobates scalaris</i> |
| Birds | Lark Bunting | <i>Calamospiza melanocorys</i> |
| Birds | Lark Sparrow | <i>Chondestes grammacus</i> |
| Birds | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Birds | Long-billed Curlew | <i>Numenius americanus</i> |
| Birds | McCown's Longspur | <i>Rhynchopanes mccownii</i> |
| Birds | Mississippi Kite | <i>Ictinia mississippiensis</i> |
| Birds | Mountain Plover | <i>Charadrius montanus</i> |
| Birds | Northern Bobwhite | <i>Colinus virginianus</i> |
| Birds | Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> |
| Birds | Scaled Quail | <i>Callipepla squamata</i> |
| Birds | Scissor-tailed Flycatcher | <i>Tyrannus forficatus</i> |
| Birds | Short-eared Owl | <i>Asio flammeus</i> |
| Birds | Western Kingbird | <i>Tyrannus verticalis</i> |
| Gastropods | Mudbank Ambersnail | <i>Catinella vagans</i> |
| Insect | A longhorned beetle | <i>Tetraopes pilosus</i> |
| Insect | A nomia bee | <i>Nomia universitatis</i> |
| Insect | A scarab beetle | <i>Cryptoscatomaseter paulseni</i> |
| Insect | A scarab beetle | <i>Geomyphilus kiowensis</i> |
| Insect | A scarab beetle | <i>Geomyphilus viceversus</i> |
| Insect | A scarab beetle | <i>Onthophagus knausi</i> |
| Insect | A scarab beetle | <i>Pardalosus neodistinctus</i> |
| Insect | A scarab beetle | <i>Tetraclipeoides dentigerulus</i> |
| Insect | A scarab beetle | <i>Trox paulseni</i> |
| Insect | A sweat bee | <i>Dieunomia apacha</i> |
| Insect | A wool-carder bee | <i>Anthidium maculosum</i> |
| Insect | Black-and-gold Bumble Bee | <i>Bombus auricomus</i> |
| Insect | Burrow Small Dung Beetle | <i>Geomyphilus thomomysi</i> |
| Insect | Ottoo Skipper | <i>Hesperia ottoe</i> |
| Insect | Pocket Gopher Flower Beetle | <i>Eupharia disciollis</i> |
| Insect | Punctured Small Dung Beetle | <i>Cryptoscatomaseter punctissimus</i> |
| Insect | Southern Chimney Bee | <i>Diadasia australis</i> |
| Insect | Southern Plains Bumble Bee | <i>Bombus fraternus</i> |
| Insect | Splendid Sweat Bee | <i>Agopostemon splendens</i> |
| Insect | Yellow Bumble Bee | <i>Bombus fervidus</i> |
| Mammals | Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> |
| Mammals | Spotted Ground Squirrel | <i>Xerospermophilus spilosoma</i> |
| Mammals | Swift Fox | <i>Vulpes velox</i> |
| Plants | Sandhill Goosefoot | <i>Chenopodium cycloides</i> |
| Plants | Sandsage Prairie-clover | <i>Dalea cylindriceps</i> |
| Reptiles | Eastern Hog-nosed Snake | <i>Heterodon platirhinos</i> |
| Reptiles | Glossy Snake | <i>Arizona elegans</i> |
| Reptiles | Lesser Earless Lizard | <i>Holbrookia maculata</i> |
| Reptiles | Long-nosed Snake | <i>Rhinocheilus lecontei</i> |
| Reptiles | Plains Hog-nosed Snake | <i>Heterodon nasicus</i> |
| Reptiles | Prairie Rattlesnake | <i>Crotalus viridis</i> |
| Reptiles | Texas Horned Lizard | <i>Phrynosoma cornutum</i> |

Aquatic EFAs

Figure 6. Aquatic Ecological Focus Areas of the Shortgrass Prairie Conservation Region. These EFAs represent landscapes where conservation actions can be applied for maximum benefit to Kansas wildlife. Each EFA includes a suite of SGCN and priority habitats.



1. Upper Republican



The Upper Republican Ecological Focus Area is composed of the South Fork Republican River. The river flows from its origins in eastern Colorado, through the northwest corner of Kansas, and into Nebraska where it joins with the Republican River. This EFA occurs in the Western High Plains ecoregion and is characterized by flat to rolling plains that are smoother, more level, and generally have thicker loess-mantled uplands than other Western High Plains regions. Dryland farming with areas of irrigated cropland agriculture are extensive throughout the region. The South Fork Republican River is considered habitat for state listed species such as the Flathead Chub, Brassy Minnow, and Plains Minnow.

Conservation Issues

Agriculture & Aquaculture

- *Farming near stream channels impacts riparian habitats, resulting in erosion, sedimentation and nutrient issues
- *Intense grazing regimes can degrade riparian habitats
- *Livestock access to streams can increase nutrient input

Natural system modifications

- *Use of ground water and surface water from rivers and streams for irrigation is lowering the water level, and as a result many miles of stream are drying
- *Structures that alter the water from its natural drainage are impacting natural hydrology of streams
- *Bank destabilization (due to riparian management, headcuts, etc.) and some subsequent stabilization methods can cause stream incision and loss of riparian habitat
- *Fragmentation from low-head dams and other impoundments impedes aquatic organism movement and reproduction
- *Channelization reduces stream habitat, and causes stream incision which reduces floodplain connectivity

Invasive and other problematic species and genes

- *Introduced non-native species negatively impact native aquatic species and habitat
- *Introduced predatory species can impact populations of native aquatic species, fisheries management in stocking game fish, can be detrimental to native species
- *Invasive plants impact riparian areas and reduce streamflows

Pollution

- *Runoff of pesticides and fertilizers

Conservation Actions

Land/water protection

- *Acquire rare, critical and/or important habitats through willing sellers/donors
- *Acquire riparian corridor acreages through willing sellers/donors
- *Acquire water rights as advisable and possible

- *Encourage conservation easements on high quality habitats

Land/water management

- *Identify pollution problem areas and improve conditions detrimental to biodiversity and endangered species
- *Promote improved water quality standards
- *Promote effective instream flow management through the development and implementation of ecologically appropriate flow regimes
 - *Encourage planting of native riparian buffers at least twice the active channel-width to improve aquatic habitats
 - *Promote ecologically sound techniques for flood control, erosion control, nonpoint source pollution control, and bank stabilization
 - *Encourage engineering techniques that promote high habitat diversity
 - *Encourage the use of fences where necessary to manage riparian corridors, and otherwise conduct proper grazing management
 - *Maximize habitat diversity for wildlife species
 - *Expand cooperative programs that supply technical and direct assistance for non-native species removal
 - *Develop plans to prevent the invasion and spread of Aquatic Nuisance Species
 - *Promote mechanical removal of non-native, invasive plant species by utilizing local habitat partnerships
 - *Promote restoration of stream channels through natural stream design
 - *Promote restoration projects that increase floodplain connectivity in incised streams
 - *Promote fish passage designs for new in-stream structures and retro-fit old structures to allow passage
 - *Coordinate with NRCS and other partners to develop and implement grazing and land management practices that benefit landowners as well as stream and riparian habitats

Species management

- *Propagate imperiled species for reintroduction and population augmentation efforts
- *Work with landowners and partners to identify appropriate reintroduction sites for imperiled species

Education and awareness

- *Inform landowners and managers of and promote best management practices
- *Educate landowners and managers on the value of rare species
- *Conduct wildlife surveys that are rigorous, quantifiable, and focused on species/habitat relationships, population demography, and community dynamics.
- *Continue disease monitoring (Chytrid Fungus, Ranavirus, etc.)
- *Investigate contaminant effects on reptilian and amphibian populations
- *Research and develop engineering techniques for effective river and stream management
- *Educate the public about the value of wetlands and streams, including riparian corridors, so they will support increased funding
- *Study the impact of introduced species on native species
- *Educate the public regarding the importance of preventing the spread of invasive species
- *Inventory perched culverts and other structures that are preventing aquatic organism passage

External capacity building

- *Promote and encourage formation of coalitions/associations such as the Comanche Pool Prairie Resource Foundation
- *Promote sound water quality standards and their enforcement through education and continue coordination with the Kansas Department of Health and Environment
- *Work with neighboring states to gain compliance of interstate compacts in regard to water rights
- *Work with county road departments and Kansas Dept. of Transportation to identify and replace structures that are preventing aquatic organism passage.
- *Promote the use of conservation culverts that retain natural stream bed features

- *Improve the coordination of mitigation activities with the Army Corps of Engineers
- *Coordinate with Watershed Restoration and Protection Strategy groups to improve water quality and habitat

Livelihood, economic and other incentives

- *Offer incentive to private landowners to preserve native habitats, remove invasive species, and use best management practices that benefit stream and riparian habitats
- *Develop practices that provide benefits to landowners and to wildlife

Species of Greatest Conservation Need

| Tier 1 SGCN | | |
|-------------|---------------------------|-------------------------------|
| Fish | Plains Minnow | <i>Hybognathus placitus</i> |
| Tier 2 SGCN | | |
| Fish | Brassy Minnow | <i>Hybognathus hankinsoni</i> |
| Fish | Northern Plains Killifish | <i>Fundulus kansae</i> |
| Fish | Orangethroat Darter | <i>Etheostoma spectabile</i> |
| Fish | Quillback | <i>Carpionodes cyprinus</i> |
| Fish | Stonecat | <i>Noturus flavus</i> |
| Fish | White Sucker | <i>Catostomus commersonii</i> |
| Mussels | Pondhorn | <i>Unio merus tetralasmus</i> |

2. Upper Arkansas



The Upper Arkansas Ecological Focus Area is the Kansas entry point of the Arkansas River, which originates in Colorado. As part of the Western High Plains, this EFA is characterized by sandy plains and dune areas that are part of the Rolling Sand Plains, as well as the Moderate Relief Rangeland with greater slopes than the surrounding flat and rolling plains. The area surrounding this EFA is called the Flat to Rolling Cropland ecoregion. The focus area contains a mosaic of land use, primarily as rangeland with areas of irrigated agriculture. The Upper Arkansas is habitat for state threatened species such as the Arkansas River Shiner, Flathead Chub and Plains Minnow.

Conservation Issues

Agriculture

- *Groundwater mining of the Ogallala Aquifer has caused parts of the upper Arkansas River to become dry, which reduces and fragments available habitat for aquatic organisms
- *Farming near stream channels impacts riparian habitats, resulting in erosion, sedimentation, and nutrient issues
- *Intense grazing regimes can degrade riparian habitats
- *Livestock access to streams can increase nutrient input

Natural system modifications

- * Use of ground water and surface water from rivers and streams for irrigation is lowering the water level, and as a result many miles of stream are drying
- * Structures that alter the water from its natural drainage are impacting natural hydrology of streams
- * Bank destabilization (due to riparian management, headcuts, etc.) and some subsequent stabilization methods can cause stream incision and loss of riparian habitat
- * Fragmentation from low-head dams and other impoundments impedes aquatic organism movement and reproduction
- * Channelization reduces stream habitat, and causes stream incision which reduces floodplain connectivity

Invasive and other problematic species and genes

- * Introduced species negatively impact native aquatic species and habitat.
- * Introduced predatory species can impact populations of native aquatic species.
- * Invasive plants impact riparian areas and reduce streamflows

Pollution

- * Widespread broadcast application of pesticides often causes off-target species mortality, contributes to development of pesticide resistance, and reduces diversity of flora and fauna while increasing soil salinity
- * Overuse/misapplication of pesticides and fertilizer also contribute to water quality degradation from runoff

Transportation and service corridors

- * Perched culverts and stream crossings prevent aquatic organism passage.
- * Reinforced concrete box and corrugated metal pipe culverts replace stream bed habitat with artificial surfaces

Conservation Actions

Land/water protection

- * Acquire rare, critical and/or important habitats through willing sellers/donors
- * Acquire riparian corridor acreages through willing sellers/donors
- * Acquire water rights as advisable and possible
- * Encourage conservation easements on high quality habitats

Land/water management

- * Identify pollution problem areas and improve conditions detrimental to biodiversity and endangered species
- * Promote improved water quality standards
- * Promote effective instream flow management through the development and implementation of ecologically appropriate flow regimes
- * Encourage planting of native riparian buffers at least twice the active channel-width to improve aquatic habitats
- * Promote ecologically sound techniques for flood control, erosion control, nonpoint source pollution control and bank stabilization
- * Encourage engineering techniques that promote high habitat diversity
- * Encourage the use of fences where necessary to manage the riparian corridor, and otherwise conduct proper grazing management
- * Maximize habitat diversity for wildlife species
- * Expand cooperative programs that supply technical and direct assistance for non-native species removal
- * Develop plans to prevent the invasion and spread of Aquatic Nuisance Species

- *Promote mechanical removal of non-native, invasive plant species by utilizing local habitat partnerships
- *Promote restoration of stream channels through natural stream design
- *Promote restoration projects that increase floodplain connectivity in incised streams
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- *Continue disease monitoring (Chytrid Fungus, Ranavirus, etc.)
- *Investigate contaminant effects on reptilian and amphibian populations
- *Research and develop engineering techniques for effective river and stream management
- *Educate the public about the value of wetlands and streams, including riparian corridors, so they will support increased funding
- *Educate landowners and managers on the value of rare species
- *Study the impact of introduced species on native species
- *Educate the public regarding the importance of preventing the spread of invasive species
- *Inventory perched culverts and other structures that are preventing aquatic organism passage

External capacity building

- *Promote and encourage formation of coalitions/associations such as the Comanche Pool Prairie Resource Foundation
- *Promote sound water quality standards and their enforcement through education and continue coordination with the Kansas Department of Health and Environment
- *Work with the county zoning boards to implement good urban planning procedures
- *Work with neighboring states to gain compliance of interstate compacts in regard to water rights
- *Work with county road departments and Kansas Dept. of Transportation to identify and replace structures that are preventing aquatic organism passage.
- *Promote the use of conservation culverts that retain natural stream bed features
- *Improve the coordination of mitigation activities with the Army Corps of Engineers
- *Coordinate with Watershed Restoration and Protection Strategy groups to improve water quality and habitat

Livelihood, economic and other incentives

- *Offer incentive to private landowners to preserve native habitats, remove invasive species, and use best management practices that benefit stream and riparian habitats
- *Develop practices that provide benefits to landowners and to wildlife
- *Promote the use of more efficient irrigation methods and drought tolerant crops to conserve water in the Ogallala Aquifer

Species of Greatest Conservation Need

Tier 1 SGCN

| | | |
|------|-----------------------|-------------------------------|
| Fish | Flathead Chub | <i>Platygobio gracilis</i> |
| Fish | Arkansas River Shiner | <i>Notropis girardi</i> |
| Fish | Peppered Chub | <i>Macrhybopsis tetranema</i> |

Tier 2 SGCN

| | | |
|---------|---------------------------|-------------------------------|
| Fish | Golden Redhorse | <i>Moxostoma erythrurum</i> |
| Fish | Northern Plains Killifish | <i>Fundulus kansae</i> |
| Fish | White Sucker | <i>Catostomus commersonii</i> |
| Turtles | Smooth Softshell | <i>Apalone mutica</i> |

Shortgrass Prairie Conservation Region Conservation Partners (not listed on Statewide List)

- Bird Conservancy of the Rockies
- Great Plains Landscape Conservation Cooperative
- Kansas Prescribed Burn Association (local associations)
- Playa Lakes Joint Venture
- Republican River Compact
- Water For Wildlife – One-Shot Antelope Foundation



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